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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

DECEMBER 31, 1932

In A New Pose

See Page 422

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The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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? DO YOU KNOW THAT ?

In recent years in the United States, diphtheria has maintained a death rate 70 times as high as smallpox.

In the past two years more cases of undulant fever have been reported in New York than in any other state.

A vacuum container exhibited at the Leipzig Fair is said to keep ice cream frozen for at least twelve hours without ice or other freezing material.

Stones such as small boys hurl at windows do no damage to the newest glass houses, the Toledo manufacturers of a new glass building block declare.

A radium emanation plant, now being installed at the University of Toronto, will prepare tiny gold tubes containing radium emanations used in treating cancer.

An inscription recently found near Rome tells of the gladiatorial contests, and says that 4,941 men were slain in 117 days of fighting in arenas of the Empire.

The disease known as pink eye, or conjunctivitis, is found to be caused by a gnat.

There are now more than 400 sight-saving classes, for children with only partial sight, in the United States.

The blister-rust of white pine has infected trees in five more states: Iowa, Maryland, Ohio, Virginia, and West Virginia.

In a great dustfall on the steppes of Russia in 1928, more than fifteen billion tons of earth were lifted in black dust clouds during a storm and redeposited.

Hungry rats will eat almost anything, but when a variety of food is available they have decided likings, preferring for instance, coarse corn to fine corn flour.

Stainless steel took a hundred days' sea test recently, when a ship sailing between London and Australia kept in use 105 stainless steel samples, from bolts and riveted plates to table utensils.

WITH THE SCIENCES THIS WEEK

Curiosity arousing questions for the teacher and general reader. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

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How does bacteriophage destroy germs? p. 419. *The Bacteriophage and Its Behavior—D'Herelle—Williams and Wilkins*, 1926, $8.

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SEISMOLOGY

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ANTHROPOLOGY

Study of Human Behavior May Shape Man's Future Course

Retiring President of A.A.A.S. Says Scientists Must Seek Those Varieties of Behavior Common to All Humanity

THE FUTURE course of mankind on earth may be shaped by the work anthropological science is now endeavoring to do, Prof. Franz Boas of Columbia University said in his address as retiring president of the American Association for the Advancement of Science.

Stressing the fact that many lines of human behavior that appear to be based on human nature are really not universal at all, but are merely characteristics of some specific culture, Professor Boas said:

"It is our task to discover among all the varieties of human behavior those that are common to all humanity. By a study of the universality and variety of cultures, anthropology may help us to shape the future course of mankind."

The anthropologist, studying man, works with history in its broadest sense, Professor Boas pointed out. His problem is to understand the steps by which man has become what he is, biologically, psychologically, and culturally. Only by tracing the course of man's development can science reach any conclusions as to conditions controlling the general history of culture.

The complexity of human cultures was emphasized by Professor Boas. Biologists, he said, are liable to insist on a relation between bodily build and culture. Geographers try to show that human culture derives from its geographical environment. Economists believe that economic conditions control the forms of culture.

While all these factors are important in shaping culture, Professor Boas declared that "every attempt to deduce cultural forms from a single cause is doomed to failure, for the various expressions of culture are closely interrelated and one cannot be altered without having an effect upon all the others."

Little hope that science will ever be able to reduce the data of anthropology to a formula for routine application was held out by Professor Boas.

"The material of anthropology is such," he said, "that it needs must be a historical science, one of the sciences the interest of which centers in the attempt to understand the individual phenomenon rather than in the establishment of general laws which, on account of the complexity of the material will be necessarily vague, and, we might almost say, so self-evident that they are of little help to a real understanding."

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METEOROLOGY

June Temperatures Predict Chances for Corn Frost

CORN FARMERS in Iowa can now tell, within a few weeks after they have their crop planted, whether or not it is likely to suffer frost damage in the fall. At the meeting of the American Meteorological Society, Charles D. Reed, of the U. S. Weather Bureau, stationed in Des Moines, told of his studies correlating June temperatures with crop records in the great corn state.

When June mean temperature has been two degrees or more above the average of 69.4 degrees, 95 per cent. or more of the corn has escaped frost damage. This generalization has held good for every one of the twelve cases studied during 43 years of record.

When June mean temperature has been normal, 69.4 degrees or higher, corn not frosted has been more than the 43-year average of 87.3 per cent. This has held good 95 per cent. of the time. Except in 1923, when only 75 per cent. of the corn escaped frost, 90 per cent. or more escaped in each of the 22 years recorded.

All the outstanding frost damage came in years when the June temperature was below 67 degrees. The worst of five bad years on record, 1924, had a crop only 33 per cent. of which was not frosted; the least evil, 1912, showed a 66 per cent. escape from frost injury.

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ENDOCRINOLOGY

Warts on Toad's Head Produce Human Glandular Secretion

EPINEPHRINE, a powerfully stimulating hormone secreted by the suprarenal glands of human beings and other higher vertebrates, is produced also by the big "warts" on the sides of a toad's head, which are really glands. Five species are known to produce it in this way, and one of them, a big tropical American toad, may produce more than three times the amount of epinephrine that can be found in a pair of human suprarenal glands.

This was one of the facts about toad gland secretions that were presented before the American Association for the Advancement of Science by a research team consisting of two Chinese and one American: K. K. Chen, A. L. Chen and H. Jensen. The work was done at Eli Lilly and Company research laboratories, Indianapolis, and at the Johns Hopkins University.

Another secretion produced by toad glands is cholesterol, mixed with ergosterol. This was found in six toad species. Ergosterol, irradiated with ultraviolet, is vitamin D, the preventive of rickets. The three scientists found that their toad cholesterol-ergosterol mixture, so irradiated, was potent against rickets.

A group of definitely poisonous principles, the bufagins, is also found in toad venom. It has an (*Turn Page*)

EPINEPHRINE FROM HIS WARTS

action similar to that of digitalis, powerfully stimulating the heart, and in more than the smallest doses producing serious consequence. Bufagin gets its name from *Bufo,* which is the zoological title of a large and widely distributed genus of toads. Two other groups of poisonous principles are known as bufotoxins and bufotenines.

The three researchers do not believe that the toad makes any practical use of its powerful chemical armament. They stated:

"The toad may be handled, irritated, or stimulated by electricity, but it will not squirt the poison. It is not likely the toad uses its poison for defensive purposes. It is more probable that the secretion is a form of useless product much like strychnine and brucine in the plant Nux vomica. The stimulation of the glandular nerves does not result in an increase of epinephrine output into the vein, so that this hormone does not seem to circulate in the blood and play the same role as in higher mammals."

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SEISMOLOGY

United States Feels Year's Most Severe Quake

THE MOST SEVERE earthquake within the United States in a year that was felt in California and Nevada late Tuesday night, Dec. 20, was centered near Mono Lake in the high Sierras not far from the California-Nevada state line. This determination was made by the U. S. Coast and Geodetic Survey using seismological reports gathered telegraphically by Science Service.

The exact epicenter was computed as 38 degrees north latitude and 118.8 degrees west longitude. The time was 10:10 p.m., Pacific Standard Time.

Not since the Texas earthquake of Aug. 16, 1931, which centered around Valentine, Texas, has so severe a shock been felt in this country. It was also reminiscent of the Montana quake of 1925.

An earthquake disturbed the bottom of the sea of the coast of Guatemala early on the morning of Monday, Dec. 19, the U. S. Coast and Geodetic Survey determined from data gathered by Science Service from five American observatories. The exact time of origin was 1:28.5 a. m., Eastern Standard Time. The epicenter was located approximately in 12.5 degrees north latitude, 93 degrees west longitude.

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BACTERIOLOGY

Scientists Discover How Tuberculosis Germs Multiply

TB Bacteria Are Found to Go Through Several Stages Instead of Following Accepted Method of Splitting in Half

THE EXACT WAY in which a single tuberculosis germ multiplies into three or more new germs has been observed by Prof. Morton C. Kahn of Cornell Medical College, New York City. He described the process before the meeting of the American Association for the Advancement of Science.

Bacteria or germs have a life cycle something like the egg, the pupa and the butterfly. Professor Kahn was the first to work out that cycle for the tubercle bacillus.

The question of how disease-producing bacteria reproduce, or multiply into more bacteria, is one of the most important problems confronting present-day bacteriologists, he said. Some believe that the organisms multiply by simply splitting themselves in half. This is probably the method of a wide variety, but he found it was not the method of the tuberculosis germ.

The rod-shaped tuberculosis germ cleaved into three or more oval bodies which became further reduced in size to extremely fine granules. From these tiny granules very small and delicate rod-shaped types developed. These rods finally elongated and thickened until they became the same size and shape as the tubercle bacillus from which they started. These new, rod-shaped tuberculosis germs were able to produce typical tuberculosis in guinea pigs.

One Germ Per Drop

In his investigation, Professor Kahn used a length of sterile glass tubing drawn to an inside diameter of about 1/10,000 of an inch. This he filled with culture fluid containing living tubercle bacilli. Tiny drops, about 1/1,000 of an inch in diameter, were then isolated under the microscope. With proper methods, these drops will contain only one tubercle bacillus or germ. The whole thing was then sealed up airtight and Professor Kahn could watch the same tubercle bacillus under the microscope day after day.

Contrary to the claims of some investigators, Professor Kahn did not find that the tubercle bacillus, even in the form of the almost sub-visible granules, could pass through fine-pored filters. He did find that some of the fine young granules and rods formed from the original tubercle bacillus lost the family characteristic of retaining certain aniline stains even after exposure to acid. This discovery is significant because this characteristic of "acid-fastness" is ordinarily used to determine, for diagnosis, whether or not specimens of sputum contain any tuberculosis germs.

Smooth to Rough

A single tuberculosis germ, he found further, can carry certain other important family characteristics. One of these is the ability of colonies of tens of thousands of individual tuberculosis germs to change from a type that is smooth, moist and glistening in appearance to a type that is dry, rough and irregular. With this ability to change from one type to another according to appearance goes the ability to have diminished or enhanced power of producing disease. These important characteristics of colonies, Professor Kahn found, belong to individual members of the colonies also.

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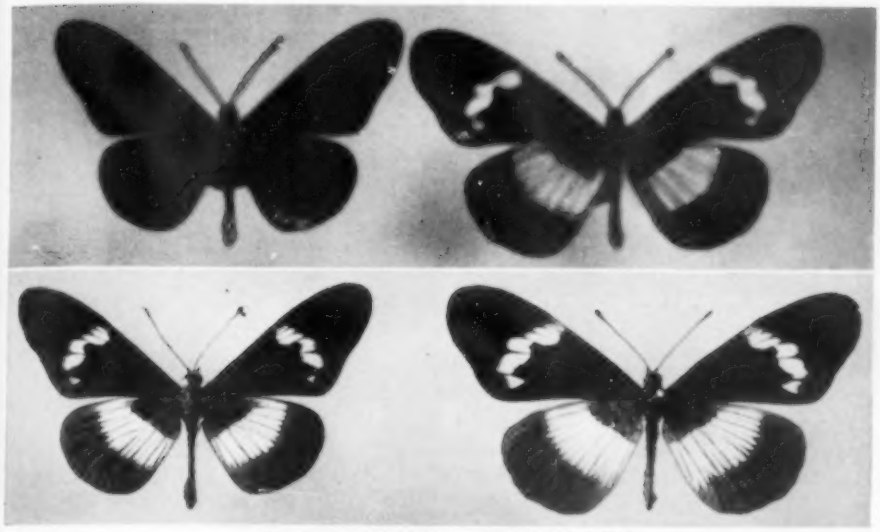
From
ATLANTIC CITY

News of discoveries reported to the great Christmas meeting of the American Association for the Advancement of Science and affiliated societies in Atlantic City is contained in this issue. Activities of the scientists during the second half of the week will be covered in SCIENCE NEWS LETTER for January 7.



BUTTERFLIES IN TWO WORLDS

Bottom—a male butterfly, left, and his mate, as they appear to man. Top—the same insects as they probably appear to other butterflies. Both are black and white photographs, the top picture being taken with sunlight from which all colors, except ultraviolet, had been screened.

ENTOMOLOGY

Ultraviolet Light Reveals Strange World to Insect Eyes

ULTRAVIOLET, invisible to human eyes, is visible to the eyes of insects, but red, visible to us, is not a color to them. This radical difference in color vision gives the world a vastly different appearance to insects.

How insects may look to each other through their ultraviolet-seeing eyes was demonstrated at the meeting of the American Association for the Advancement of Science, by Dr. Frank Lutz and Richard Burlingame of the American Museum of Natural History. The two entomologists displayed a series of butterfly and moth photographs taken by ultraviolet light, together with a specially prepared scale of ultraviolet "color" values.

The ultraviolet pattern of an insect may or may not correspond to the pattern we see on it by visible light. One specimen displayed had spots on its wings that are red to human eyes, and hence invisible to insect eyes. But the same spots are rich in ultraviolet, and hence visible to insects by that radiation. In other species, the ultraviolet spots overlap areas that by visible light have several different hues.

Male and female butterflies may have the same ultraviolet value, but in some species the sexes differ. Where they do, it is usually the female that is "brighter" by ultraviolet. One common butterfly species has two entirely different kinds of females, one being yellow like her mate, the other entirely lacking in that color. But these "blonde" and "brunette" sisters are alike under the ultraviolet: except for small faint spots they have no ultraviolet "color" at all. They probably look alike to the male, which sees yellow poorly if at all.

One of the most interesting of the displays was of a common species exhibiting the phenomenon known as mimicry. There are several different forms of females, each differing in color pattern from the male but resembling some "protected" species. This is supposed to fool preying birds and lizards. In the display, ultraviolet photographs of "mimics" and "models" were shown together. They appear even more alike by ultraviolet than they do by ordinary light. Thus their mimicry extends into a field where it may have no practical value, because while the ultraviolet-seeing powers of birds and lizards have not been well investigated, they probably do not see by these short waves.

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PUBLIC HEALTH

Black Rat Brings Plague Danger to Britain

LONDON medical scientists fear that a plague epidemic may break out there sooner or later if present conditions continue. The calamity, if it comes, will be the result of interfering with nature's biological balance. This feeling is crystallized by Dr. W. Langdon Brown, Regius Professor of Physic at Cambridge University.

The plague-carrying flea lives on rats, but black or dark rats are a worse plague menace than brown ones. In Britain black rats are gradually increasing. If they are allowed to continue to multiply a plague epidemic in London is likely to follow. In big cities such epidemics tend to break out as soon as carriers of the germ become sufficiently numerous.

London's freedom from plague epidemics since the "Great Plague" of 1664-5 has been due to the dominance of the brown rat, which came to England on ships, bred very rapidly and almost exterminated its natural enemy, the black rat. During recent years, however, there have been so many campaigns against rats in general that millions of the brown rats have been destroyed. The race of black rats has thus been able to make headway.

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EDUCATION

Gifted School Children Younger Than Average

GIFTED CHILDREN in high school average about two years younger than their schoolmates, Dr. Edna E. Lamson of the State Normal School at Jersey City reported. Dr. Lamson told of her investigation at a meeting of the American Association for the Advancement of Science.

School careers of 56 children with intelligence quotients above 127 were followed, and compared with careers of rank and file high school students.

"Gifted children in senior high school maintain a high scholastic achievement throughout the course," Dr. Lamson stated. "They make a scholastic record that is significantly superior to the rank and file of high school pupils who are two years older, and receive a disproportionate share of scholastic honors."

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ASTRONOMY-GEOLOGY

Comet Larger Than Halley's May Have Hit Atlantic Coast

Ice Age Depressions Are Found to be Shaped Just as if They Had Been Dug Out by Celestial Bullets

SPECULATIVE romancers of the Verne-Wells type, who like to imagine what would happen to the earth if a comet should hit it, may find their answer in a series of wide holes in the ground in the Carolinas, known locally as "bays." At the meeting of the American Association for the Advancement of Science, Prof. F. A. Melton and Prof. William Schriever, of the University of Oklahoma, set forth reasons why they believe the "bays" to have been gouged out by the impact of a globular cluster of meteorites constituting the nucleus of a comet greater than the famous Halley's comet.

Cover 40,000 Square Miles

The bays are shown by geological evidence to be older than certain strata of pleistocene or Ice Age date, but younger than another formation of pliocene date, which preceded the Ice Age. They all lie in the Atlantic coastal plain area, between Norfolk, Va., and the Savannah river, an area of approximately 40,000 square miles.

A mosaic airplane photograph map shows all the "bays" to be smoothly elliptical in shape, with their long axes all parallel, extending from northwest to southeast. Some of the depressions have elevated rims completely encircling them, and all such rims are higher at the southeastern end. Sometimes the depressions intersect each other. The bigger the hole the longer it is, relative to its width.

Hit Mountains and Sea

All these features, the two scientists said, can be explained on the hypothesis that the depressions were caused by the blows of a group of high-velocity masses of meteoric material, tearing through the atmosphere from the northwest and striking the earth like projectiles. Successively striking masses could cause the intersecting depressions, and the greater energy of impact of the larger fragments would of course explain the relatively longer holes they plowed. The direction of their impact would account for the greater height of the raised rims toward the southeast.

The comet that made the "bays" also bombarded the adjacent mountain regions and dropped fragments into the sea, the two scientists conjecture. But the scars they caused in the mountains have been eroded away due to the more rapid weathering of the earth on steep slopes. The pieces that fell into the sea of course left no traces.

When Halley's comet last visited the neighborhood of the earth, astronomers could look right through its head and see small spots on the sun. This was taken to indicate that its nucleus was made of fragments rather than a solid piece. Such a cluster of meteoric masses, striking the earth like a handful of pebbles thrown into a snowbank, would cause a cluster of depressions essentially like the Carolina "bays."

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PSYCHOLOGY

Noise Increases Activity of Infants

NEWBORN infants respond to noise in their surroundings by increased activity, Dr. Karl C. Pratt, Central State Teachers College, Mt. Pleasant, Mich., told the American Association for the Advancement of Science.

Dr. Pratt reported tests he had made on 28 babies from two to eleven days old. The infants were placed in a special cradle to which electric recording devices were attached for the purpose of making a record of every kick and squirm. High-pitched, intense noises produced the greatest activity, but musical tones had a quieting effect.

Even such young infants are able to adjust themselves to noisy surroundings, however, for after the noise was continued for a time it produced less effect. The activity was a response to each individual noise and not the result of increased restlessness, irritability, or fear, Dr. Pratt said.

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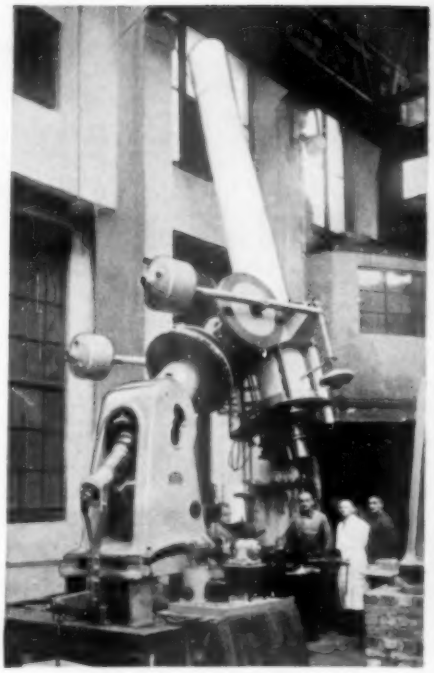

NOT FOR ASTRONOMERS

ASTRONOMY

Big Telescope Made Especially for Public

A BIG TELESCOPE weighing seven tons, with a tube 14 feet long and lens ten inches in diameter, has been specially constructed, not for astronomers, but for laymen who wish to view the skies. It was built so that the public can use it with least inconvenience. The instrument has just been completed at the Zeiss works in Germany and will be set up in the Franklin Institute Museum, Philadelphia, as the first telescope of its kind to be erected in the United States.

If this were an ordinary telescope it would be supported close to the center of its 14-foot tube. This would mean that the eyepiece, through which the visitor looks, would move a vertical distance of half the length of the tube, or seven feet, as the telescope covers the skies from the horizon to the zenith. Then the visitor would have to climb a high ladder to follow the eyepiece. But this inconvenience is avoided because the instrument is supported close to the eyepiece. Counterweights balance the overhanging end that points to the sky.

The instrument will be used in conjunction with a reflecting telescope with a 24-inch mirror.

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ARCHAEOLOGY

Country Lost for 20 Centuries Found Without Digging Ruins

"Sealand" is Name Given Nation That Writings Suggest Rivaled Babylonia, Assyria and Chaldean Empire

A GREAT country lost to history for twenty centuries has been discovered by Prof. Raymond P. Dougherty of Yale University. Ancient history will have to be revised, it appears, to make room for this neglected land, its kings, and its people.

Prof. Dougherty has found evidence that in the ancient world there was an important country known as the Sealand, or the Land of the Sea, which covered a large part of the Arabian peninsula.

This Sealand of Arabia has come to light, not by digging up ruins and records—that may come later—but by careful study of disconnected references to such a place in writings of Babylonia and Assyria. Results of these studies have just been reported by Prof. Dougherty in a scientific volume. Prof. Dougherty places the Sealand on the map in Arabia because an accumulation of evidence in cuneiform writings points to that location. An increasing number of cuneiform writings which have been unearthed and turned over to scholars to decipher is yielding the information proving existence of such a country.

Prof. Dougherty outlines the history of the Sealand in three main epochs. The first, lasting from possibly 2500 B.C. to 1000 B.C. was outstanding for intrusion upon affairs of Babylonia. The second from 858 to 626 B.C. was during the height of Assyria's power, and the Sealanders, far from quaking at the Assyrians, played an aggressive role. The third epoch, running late into the sixth century B.C., was the time of the Chaldean Empire. This last Sealand dynasty, Prof. Dougherty says, was a contributing cause to the downfall of Assyria in 616 B.C., thus winning the long rivalry.

The Sealanders were a melting-pot population, judging from present knowledge. Some of their earliest kings had Semitic names, some Sumerian.

The earliest records about these people show that they had already an advanced idea of religion. Their notion of divinity included such concepts as mercy, beneficence, and absoluteness. Existence of such ideas, Prof. Dougherty says, constitutes a source and an influence which must be taken into consideration in attempts to trace the origin of early Hebrew religious concepts.

How the incongruous-sounding name Sealand might have been given to Arabian country is explained by Prof. Dougherty. Travelers often compare Arabian sand dunes to a billowing sea. Another possible origin of the name is the prevalance of the saline deposits water in Arabia, suggesting the sea.

Scientific excavations have never been welcomed in Arabia, and so far science has had no good opportunity to find out what buried cities and writings lie there.

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BACTERIOLOGY

Bacteriophage Makes Germs Swell, Burst and Disappear

THE EXACT process by which bacteriophage destroys bacteria or germs was described by Prof. J. Bronfenbrenner of Washington University Medical School at the meeting of the Society of American Bacteriologists. Watching the bacteria under the microscope, he saw that under the influence of the bacteriophage they swell, burst and disappear.

Further investigation showed that the swelling is the result of imbibing water. This in turn results from digestion within the cell of part of the cell protoplasm and consequent increase of osmotic pressure within the cells.

Before the swelling starts, however, and very soon after the bacteriophage is added, the rate of growth of the bacteria is greatly increased. This acceleration of the processes of growth and digestion is the primary effect of the bacteriophage, Professor Bronfenbrenner concluded. The consequent imbibition of water, swelling, bursting and disappearance of the germs are secondary effects.

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HYGIENE

New Hygienic Butcher's Shop Dispenses Meat and Ideas

A BUTCHER'S shop, clean and germ-free like a hospital operating room, has just been opened in Paris with the public blessings of several professors of the Faculty of Medicine and of representatives of the local authorities.

Dr. Kaplan, the author of this new venture in practical hygiene, has installed his salesmen in a huge glass chamber, the air of which is constantly being renewed and filtered, and kept at a temperature of 7 degrees Centigrade (45 degrees Fahrenheit). The salesmen wear rubber gloves and are dressed in white from top to toe. They cut up, weigh and pack the meat under the eyes of their customers with whom they communicate by means of microphones and loud speakers.

In the basement the meat is kept in refrigerators or in cold storage during the 48 hours which intervene between the arrival of the meat and its sale. Many other eatables besides meat are sold, and Dr. Kaplan has developed remarkable ingenuity in shepherding food from its source to the customers' hands with the minimum of contamination and exposure.

Not only are Parisians being served with much cleaner food than heretofore, but they are absorbing practical lessons in hygiene which it is to be hoped they will apply on returning to their homes.

On the whole, the reaction of the Parisians has been favorable. But one captious critic has protested against the white raiment and rubber gloves of the salesmen. They reminded him painfully of a surgeon in an operating theater. Butchers' shops, he felt, existed to provide palatable meat, not visions of appendicitis or peritonitis. This squeamishness does not, however, seem to have overtaken many of the shop's customers, for it is thronged by housewives willing, not only to pick up bargains in meat, but also tips in hygiene.

The shop bristles with such tips. The housewife who for years has been accustomed to finger and smell meat before she buys it must feel baulked of those exercises of her tactics and olfactory faculties, but she will doubtless console herself with the reflection that smells in such a Pasteur-inspired atmosphere as that of this modern butcher's shop are an anachronism.

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AVIATION

New Auxiliary Wing Increases Airplane Safety

DETAILS of experiments in which a small auxiliary wing was fastened above and in front of the main wing of an airplane to make the craft safer by decreasing its landing speed, have been revealed by the National Advisory Committee for Aeronautics. The device, which was developed and tested at the Committee's Langley Memorial Aeronautical Laboratory at Langley Field, Va., reduced the landing speed of the test airplane by nine miles per hour. (*SNL., Dec.* 24, '32, p. 399.) Additional research is being carried on to determine how auxiliary airfoils of this kind may be applied to other types of airplanes to make them safer by lowering landing speed without sacrificing cruising speed.

On the airplane tested, resistance to air, or drag, was increased only slightly while the speed range of the craft in level flight was augmented ten per cent. With the auxiliary wing the airplane cannot fly as fast as it could without it by 1.7 miles per hour but it can reach a new low speed in level flight five miles per hour less than was possible without the airfoil. Additional advantages are a larger range of gliding angles, a higher maximum lift coefficient and improved pitching moments.

The greater range of gliding angles means ease in landing. The National Advisory Committee points out that from an altitude of 100 feet the airplane with the auxiliary airfoil could be landed without stalling anywhere from 326 feet to 860 feet from the starting point, whereas without the airfoil the landing range would be from 660 feet to 860 feet.

Though no attempt was made to achieve light weight in constructing this first experimental airfoil, only 130 pounds were added to the weight of the craft. For this test airplane, a small parasol monoplane, the airfoil is 30 feet long and 10 inches wide. It is located so that its trailing edge is 10 inches in front of the nose of the main wing and nine inches above it.

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ASTRONOMY

Moon's Shadow at Eclipse Nearly Four Seconds Late

THE MOON'S shadow at the total solar eclipse of Aug. 31 was three and eight-tenths seconds late and its southern edge was about four-tenths of a mile off from its predicted location, William M. Browne of the U. S. Naval Observatory told the American Astronomical Society.

A naval airplane expedition obtained what are believed to be the first aerial eclipse photographs that allowed the accurate location of the moon's shadow on the earth. The check upon the eclipse that was thus afforded is considered by astronomers to show that the prediction was as accurate as could be expected.

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GENERAL SCIENCE

Institution Proposed For Central Asian Research

FOR PERMANENT exploration and research in the vast and as yet but little known territory of Central Asia, comprising Mongolia, southern Siberia, Chinese and Russian Turkestan and Tibet, an international research institution should be established, with headquarters preferably in China. This suggestion was put forth before the New York Academy of Sciences by Roy Chapman Andrews, of the American Museum of Natural History, noted for his successes in the Central Asian field.

The idea came to Mr. Andrews during the course of his work in Mongolia. Due to circumstances, he has temporarily abandoned it, he said, but he considered it worth recording in the hope that it might be put into effect at some future time.

"What might be designated as an 'International Institution for Asiatic Research' would be established with its executive center in New York and its field headquarters in Peking," Mr. Andrews said. "As a beginning it would have an endowment of a million gold dollars which I had intended to raise personally. As the work progressed, this endowment could be expected to be materially enlarged, giving an ever increasing income for field research."

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MEDICINE

New Compound Found to be Cause of Coal Tar Cancer

THE EXACT chemical nature of the substance in coal tar which produces cancer has been discovered. The substance itself has ben produced synthetically in the laboratory. This important success, following many years of failure, has just been reported to *Nature*, by Dr. J. W. Cook, I. Hieger and Hewett of the Cancer Hospital Research Institute in London.

One type of cancer, which often afflicts chimney sweeps and workers in the coal tar industries, is due to irrication with coal tar, scientists found some time ago. The same type of cancer occurs in mice that have had coal tar painted on the skin. Now the British investigators have found that the cancer-producing constituent of the coal tar is a previously unknown compound of hydrogen and carbon, 1.2 benzpyrene.

Samples of this compound which they made in the laboratory were as effective as material isolated from pitch in producing cancer of the skin in mice. The rapidity with which this synthetic compound caused skin cancer in mice indicated that it is the most active cancer-producing hydrocarbon known. Ordinarily it takes some time for the coal tar cancers to be produced.

The cancer-producing benzpyrene was isolated by concentrating active fractions of coal tar pitch using a method of fluorescence spectroscopy developed by Mr. Hieger and W. V. Mayneord. The synthetic material was produced from pyrene, a complex hydrocarbon isolated from coal tar, but not to be confused with the popular fire extinguisher which has the trade-name of pyrene and is carbon tetrachloride.

While the identification and synthetic production of this substance responsible for one type of cancer has no immediate bearing on discovery of a cure for the disease, it should be a great aid to cancer research.

In the course of their study, the investigators also isolated from coal tar pitch three other hitherto unrecognized coal tar constituents and identified one of them by synthesis. These are two hydrocarbons composed entirely of benzene rings, namely perylene and 4.5 benzpyrene, and one other compound, 1.2 benzanthracene from the chrysene fraction of coal tar. The 4.5 benzpyrene, which is closely related to the cancer-producing substance, was the one synthesized.

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ASTRONOMY

Newly Discovered Comet May Be Tempel's of Meteor Fame

THE DISCOVERY of a comet that may prove to be Tempel's comet of 1866, known to be associated with the famous Leonid meteors of November, has been reported by Dr. G. F. Dodwell, director of the Adelaide, Australia, Observatory.

The close approach of Tempel's comet has been predicted and for the past two months astronomers the world over had been searching for it. The theory is that the Leonids are the debris of a part of the comet or one traveling in a similar orbit around the sun.

The comet observed from Adelaide is in the southern skies and it is visible only through powerful telescopes. The discovery by Dr. Dodwell was made Saturday, Dec. 17, at one o'clock, Greenwich Civil Time, and at that time the comet was in right ascension 23 hours 2 minutes 24 seconds, and declination 28 degrees 43 minutes south.

The Dodwell comet was sighted from Harvard College Observatory by Drs. F. L. Whipple and Leland E. Cunningham, on Dec. 20.

It was then of the eleventh magnitude, visible only through large telescopes, low in the south- (*Turn Page*)

western evening sky just above the bright star Fomalhaut. Discovered by Dr. G. F. Dodwell at Adelaide, it was suggested that it might be Tempel comet of 1866, associated with the famous Leonid meteors, but it has not yet been determined whether the newly found comet is this object or a comet hitherto unknown.

Appearing as a diffuse object on photographic plates, the Dodwell comet discovered at Adelaide, Australia, has been located by Prof. George Van Biesbroeck of Yerkes Observatory. The photographic image is of ninth magnitude and shows no tail.

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MEDICINE-BACTERIOLOGY

Filtrable Viruses Will Not Thrive on Lifeless Food

FILTRABLE VIRUSES, which cause such diseases as smallpox, yellow fever and rabies, and filtrable bacteria are not the same, Dr. Roscoe R. Hyde of Johns Hopkins School of Hygiene and Public Health emphasized in a discussion of filtrable viruses at the meeting of the American Association for the Advancement of Science.

A filtrable virus is one thing. A bacterium that will ordinarily pass through a filter, or may be made to do so by special methods, such as growing on the "K" medium of Prof. Arthur I. Kendall of Northwestern University, is distinctly another, Dr. Hyde said in effect.

No one has so far been able to make the filtrable viruses grow and multiply on any lifeless medium, as can be done for bacteria, filter-passing or otherwise.

Dr. Hyde does not believe that the organisms which Prof. Kendall has grown on his special media are alternate forms of the disease-causing viruses. Prof. Kendall grew the organisms from cases of measles, influenza and the common cold, all said to be caused by viruses.

"This is not surprising," said Dr. Hyde, "as organisms from these diseases have frequently been cultivated on ordinary media. But it is most unlikely that any of these organisms are the causative agents of the diseases in question."

Challenge to Man

The viruses lay a challenge to man not only for his food, his clothing and his shelter, but for his very life, Dr. Hyde declared. Much of the confusion about them results from the fact that they are known by what they do, rather than by what they are.

"It is commonly stated that the common cold is due to a filtrable virus. The statement may be true but the evidence at present does not warrant this conclusion," Dr. Hyde said, pointing out that the agent causing a common cold will pass through a filter but is not necessarily a virus.

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PUBLIC HEALTH

Influenza Outbreak Is Travelling North And East

THE INFLUENZA outbreak is travelling north and east, reports received at the U. S. Public Health Service for the week ending Dec. 17 indicate. The total for the country was 33,823, an increase of more than 6,000 over the previous week's total. The South is chiefly affected, while the New England and New York group of states have not reported any signs of an outbreak yet. Alabama reported the largest number of cases, 7,034.

Only about eight or ten per cent. of the actual number of cases of influenza get reported, health authorities point out. Many patients do not call a physician for a mild case, and many physicians do not report mild cases which appear to be severe attacks of common cold. The disease is running a comparatively mild course with few fatalities in the present outbreak.

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ENGINEERING

Six Colors Mix in Water At Base of Capitol

See Front Cover

ONE OF THE MOST spectacular fountain lighting systems places the capitol at Washington in a new setting, when the building is viewed from the direction of the Union Station.

Engineers describe the recently installed system as a fixed color installation. Water in the fountain and terrace plays over a combination of six colors. Considering the size of equipment and electric power consumption, this is one of the largest installations of its kind, according to the Westinghouse Electric and Manufacturing Co., which supplied the photograph.

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ETHNOLOGY

Cannibalism Remains Because Old Chiefs Like Human Flesh

CANNIBALISM among the Namba tribes of the New Hebrides will never be wiped out during the lifetime of certain old chiefs who eat human flesh because they like the flavor.

Miss Evelyn Cheesman, leader of an expedition to the New Hebrides, gives this as the statement of Ringapat, King of the Big Nambas dwelling in the small island of Atchin. Miss Cheesman presented her findings before the Royal Geographical Society in London.

The Nambas' idea of eating a corpse is to prevent the murdered man's spirit from walking the earth and causing mischief. They believe that if the body is shared among several people the spirit ceases to exist. Only enemies are thus disposed of. The more feared the man in life, the quicker the feast takes place to put the spirit out of action.

Fear seems to be the sole motive among these cannibals. Respectable members of the tribe are said to despise the cannibals for their depraved tastes. Miss Cheesman reported that there was no indication that a feast was held with the idea of acquiring any of the dead man's qualities such as strength or courage.

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BOTANY

NATURE RAMBLINGS
by Frank Thone

Christmas Thorn

THERE is an old legend to the effect that after the Crucifixion, Joseph of Arimithea left Judea, bent on going as far as possible from that tragic land. Landing in Britain, then the limit of the known world, he planted his wanderer's staff in the ground at the place now known as Glastonbury. The staff grew and put forth green leaves, and flowers that opened on Christmas day.

One plant that is common in Palestine and is now widely cultivated is pointed out as the thorny staff of Joseph. This is the shrub known as *Euphorbia splendens*, a relative (though it does not look it) of the poinsettia which is now another favorite Christmas ornament. Like all of its kind, it has a bitter, milky juice, and like most other euphorbias it has a four-angled stem and relatively few leaves.

The old legend has at least this element of probability in it, that a stem of this euphorbia could be cut and carried about apparently dried for many months without losing its life. Set in the soil and let alone, it would respond to the moisture by striking root and eventually producing leaves and branches. It might even break into bloom on Christmas day, in the mild climate of southern England.

Even with us, in our more severe continental climate, this shrub is fairly hardy. With a little protection in the North, and none at all in the South, it will get along outdoors. In the greenhouse, or as a potted plant in the window, it thrives mightily, and will produce a profusion of coral-colored, odd-shaped inflorescences to reward the housewife or gardener who is willing to give it room.

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GEOLOGY

Geologists Attempt to Check "Ups and Downs" of Sea Level

EVIDENCES for and against changes in sea level on the Atlantic coast were discussed by geologists meeting with the American Association for the Advancement of Science.

The necessity for determining just where the sea level is, was stressed by H. A. Marmer of the U. S. Coast and Godetic Survey. We are accustomed to talk of "sea level" as though it were a fixed and unchanging thing; but according to the speaker it may change as much as a foot in a day, while within a year the values of sea level from two different days may differ by as much as five feet. Even yearly values of sea level may show differences of a quarter of a foot or more.

The only way of obtaining an accurate determination of mean sea level is by long-continued series of observations. The longer the period, the more accurate the determination. In general it may be taken that when corrected by suitable simultaneous observations, a month of observations will give mean sea level within a tenth of a foot, a year will give it within a twentieth of a foot, while four years will give it within a fiftieth of a foot, Mr. Marmer said.

Charles W. Townsend, of Ipswich, Mass., presented data that indicate a genuine subsidence of the coast in the region he has been studying. Stumps and logs of forest trees now occur in a salt marsh near Ipswich, he said, and there is a tradition of a forest growth there over a hundred years ago. There are many places on the New England coast, he continued, where peat and stump layers are found below high tide mark, and sometimes below low water mark. Borings in the salt-hay zone show it to extend to twelve feet below the surface, while the range of the living zone is only about two feet. Experiments both in this country and in England have shown the upbuilding of shore marshes at rates of from one to two feet a century.

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METEOROLOGY

Changes of Humidity With Thunderstorms Are Explained

THUNDERSTORMS are commonly accompanied by changes in atmospheric humidity, but the changes do not always occur in the same direction. Sometimes the air becomes moister, sometimes less moist. To find an explanation for this apparent anomaly, Prof. W. J. Humphreys of the U. S. Weather Bureau examined records of a large number of thunderstorms. He reported his results at the meeting of the American Association for the Advancement of Science.

Thunderstorms are of two general types, "heat thunderstorms" and "cold front" storms. The first type arises from the overturn of large masses of heated air, the second from the impact of an oncoming mass of migrating colder air against a body of warmer air. Heat thunderstorms, Prof. Humphreys found, are accompanied by an increase in atmospheric humidity, while the humidity falls when the cold-front storm comes on.

This is, Prof. Humphreys explained, about what should be expected. The heat storm is started in a mass of air which contains the same amount of water vapor all the way through, and the falling rain increases it by evaporating part of itself as it falls. The cold-front storm, on the contrary, is caused by cold, dry air moving into a region of warm, moist air, and the aridity of the cold air is not offset by the evaporation from the falling rain.

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A gasoline substitute tried with some success in Ireland is creosote oil, which is a waste product of the gas industry.

First Glances at New Books

Geography-Social Science

ATLAS OF THE HISTORICAL GEOGRAPHY OF THE UNITED STATES—Charles O. Paullin, edited by John K. Wright—*Carnegie Institution of Washington and the American Geographical Society of New York* 166 plates, 164 pages. $15. Undoubtedly one of the classic reference books of recent years, this monumental compilation is at once a major contribution to geography, history, economics and all the other social sciences. For years in the making by the Carnegie Institution's department of historical research, its text and arrangement are out of the American Geographical Society's "laboratories" of geography. In its more than 400 pages each folio size, there are more than 620 maps, many in color, together with text and ample index. Its wide scope is indicated by the following divisions: The Natural Environment; Cartography; Indians; Explorations in the West and Southwest; Lands; Settlement, Population, and Towns; States, Territories, and Cities; Population; Colleges, Universities, and Churches; Boundaries; Political Parties and Opinion; Political, Social, and Educational Reforms; Industries and Transportation; Foreign Commerce; Distribution of Wealth; Plans of Cities; Military History; Possessions and Territorial Claims of the United States.

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Chemistry

AN INTRODUCTORY COURSE IN PHYSICAL CHEMISTRY—Worth Huff Rodebush and Esther Kittredge Rodebush—*Van Nostrand,* 421 p., $3.75. This textbook evolved and tested at the University of Illinois represents a year's course in physical chemistry. Happily, "In order to avoid dullness the authors have not hesitated to sacrifice rigor. In order to stimulate the interest of the student a considerable amount of speculative material has been introduced which will ultimately need revision."

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Engineering-Education

ENGINEERING: A CAREER—A CULTURE—*Engineering Foundation,* 61 p. Free. With the active cooperation of groups in six national engineering societies, this pamphlet has been prepared as a message to young men, to parents and to teachers. The professional functions of the engineer are stated with the precision which accompanies intimate knowledge of engineering in theory and practice. The major divisions of engineering are dealt with from this standpoint, the text being "descriptive of the profession of engineering — of its spheres of action, of the training and the qualities required for its successful pursuit; of the obligations which it imposes, and the rewards which it affords."

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Engineering

THE EARLY YEARS OF MODERN CIVIL ENGINEERING—Richard S. Kirby and Philip G. Laurson—*Yale Univ. Press,* 324 p., $4. This valuable contribution to the history of science and engineering, written by two professors in Yale University, will give practicing and student engineers a perspective which hitherto has been lacking in their education. It is to be hoped that the availability of historical information contained in this volume will inspire local and national historical engineering societies to mark properly the engineering landmarks which have had historical significance in the industrial development of the nation.

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Medical Economics

UNIVERSITY STUDENT HEALTH SERVICES—Don M. Griswold and Hazel I. Spicer—*University of Chicago Press,* 110 p., 90c. One of the last publications of the Committee on the Costs of Medical Care before completion of its work. This study gives the organization, services rendered and costs of student health services in Cornell University, Yale University, University of Michigan, University of Minnesota, University of California and Oregon State Agricultural College.

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Physics

ELECTRICITY AND MAGNETISM—Norman E. Gilbert—*Macmillan,* 548 p., $4.50. A text by the professor of physics at Dartmouth College which is intended for college use in courses for the non-technical student that are more extended than general physics courses.

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Otology

YOUR HEARING, HOW TO PRESERVE AND AID IT—Wendell Christopher Phillips and Hugh Grant Rowell—*Appleton,* 232 p., $2. A valuable and important book written for the layman by two authorities. What the normal person can do for his hearing, the effects and desirability of swimming and diving, lip-reading, jobs for the deafened, education of the deaf and hard-of-hearing, marriage of the deaf and of the hard-of-hearing, hearing aids, and ear trouble are among the subjects discussed. The value of the book is by no means limited to those whose hearing is already a problem.

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Radio

BROADCASTING ABROAD — *National Advisory Council on Radio in Education,* 84 p. A handbook of information on the status of broadcasting in other countries. Listeners' license fees, averaging some twenty-five cents per month per set, collected usually by postmen, are the chief support of radio in nearly every country in the world except the United States. Advertising by radio provides part of the revenue in France, Ireland, Poland, Spain, Rumania, Yugoslavia, Lithuania and Australia, while advertising is also permitted under certain conditions in Germany, Norway, Italy and Turkey.

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Physics

HOW THINGS BEHAVE—J. W. N. Sullivan—*Black, London,* 95 p., 2s. 6d. In story form, Mr. Sullivan discusses for children, as an introduction to physics, the melting of lead, heat, sound, light and colors, electricity, the moon and the sun and other worlds, energy, rain, a little chemistry, and the rainbow.

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Mathematics

A SHORT COURSE IN TRIGONOMETRY —James G. Hardy—*Macmillan,* 142 p., $2.25. A text by the professor of mathematics in Williams College.

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